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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,862	07/17/2003	Jan Boer	6-2-2-5	1756

7590 04/04/2007

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EXAMINER	
MALEK, LEILA	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/621,862	BOER ET AL.
	Examiner	Art Unit
	Leila Malek	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 31 January 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-38 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-34 and 36-38 is/are rejected.

7)☒ Claim(s) 35 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 09/22/2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments regarding to the USC § 103 of claims 1, 25, and 38 filed on 01/31/2007 have been fully considered but they are not persuasive.

Applicant's Argument: Applicant argues, on page 4, lines 4-9, that "Sano fails to teach or suggest the claimed limitation of generating a reference field based on a field of the received signal and on a channel estimation signal".

Examiner's Response: Examiner asserts that Sano teaches generating a reference field (see Fig. 1, outputs of the fading compensating units) based on a field of the received signal (see the delayed version of the received signal) and on a channel estimation signal (see the outputs of the channel estimation unit).

Applicant's Argument: Applicant argues, on page 4, lines 17-21, that "Sano fails to teach or suggest the claimed limitation of generating a signal quality estimate as a function of the at least one field in the received signal and the generated at least one reference field".

Examiner's Response: Examiner asserts that Sano teaches generating a signal quality estimate (see the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the received signal) and the generated at least one reference field (i.e. the output of the fading compensating unit which is based on the delayed version of the received signal)".

Applicant's Argument: Applicant argues, on page 5, lines 3-9, that "Sano fails to teach or suggest the claimed limitation of measuring at least one characteristic corresponding

to the at least one field in the received signal and generating a signal quality estimate as a function of the at least one characteristic corresponding to the at least one field in the received signal".

Examiner's Response: Examiner asserts that Sano teaches measuring at least one characteristic corresponding to the at least one field in the received signal (i.e. measuring the signal to interference ratio) (see column 5, lines 56-58); and generating a signal quality estimate (see the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field (see the outputs of the fading compensation units, and column 6, lines 48-58).

2. Applicant's arguments, regarding to the rejections of the following limitations have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made.

a. "Comparing the at least one field in the received signal with the at least one reference field and generating a difference signal corresponding thereto".

b. "Generating a signal quality estimate, the signal quality estimate being a function of the difference signal".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 12-14, 16, 17, 25, 28, 33, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano (EP 1367752 (see the IDS cited by the Applicant)), in view of Tzannes et al. (hereafter, referred as Tzannes) (US 2004/0047296).

As to claim 1, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); generating at least one reference field based (see the outputs of the fading compensation clocks), at least in part, on the at least one field (see the outputs of the delay unit) and on a channel estimation signal (see the outputs of the channel estimator) (see Fig. 1 and column 6, lines 44-48, see the output of the), the channel estimation signal being representative of at least one characteristic of the wireless communication channel (i.e. the SIR); and generating a signal quality estimate (see the outputs of the SIR calculator blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field and (column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 1, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between

transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize the communication data rate (see the abstract).

As to claim 5, Sano further discloses delaying of the at least one field in the received signal by an amount substantially equal to a latency associated with generating the at least one reference field (see column 6, lines 49-51).

As to claim 12, Tzannes discloses that at least a portion of the received signal is organized as an Institute of Electrical and Electronics Engineers (IEEE) standard 802.11 frame, the at least one field in the received signal comprising a SIGNAL field in the IEEE 802.11 frame (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to allow the host to use different transmission rates by using the IEEE standard 802.11a and make the system more flexible.

As to claim 13, Sano further shows that channel estimation signal is obtained at least prior to generating the at least one reference field (i.e. outputs of the fading compensation unit) (see Fig. 1).

As to claim 14, Sano further shows that the received signal comprises at least one training symbol (i.e. the pilot symbol) and the channel estimation signal is computed based at least in part on the at least one training symbol in the received signal (see Fig. 1).

As to claim 16, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); measuring at least one characteristic corresponding to the at least one field in the received signal (i.e. measuring the signal to interference ratio) (see column 5, lines 56-58); and generating a signal quality estimate (see the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field (see the outputs of the fading compensation units, and column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 16, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets

communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize the communication data rate (see the abstract).

As to claim 17, Sano discloses that characteristic comprises signal to interference ratio (or signal to noise ratio) of the at least one field in the received signal (see column 5, lines 56-58).

As to claim 25, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field based (see the outputs of the fading compensation units) (inherently by using a controller), at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being representative of at least one characteristic of the wireless communication channel (i.e. the SIR); and generating a signal quality estimate (see the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one

reference field (see the outputs of the fading compensation, and column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 25, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e, 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize the communication data rate (see the abstract).

As to claim 28, Sano further discloses that the step of delaying the at least one field in the received signal by an amount substantially equal to a latency associated with generating the at least one reference field (see column 6, lines 49-51).

As to claim 33, Sano further shows that channel estimation signal is obtained at least prior to generating the at least one reference field (i.e. output of the fading compensation units) (see Fig. 1).

As to claim 38, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field based (inherently by using a controller), at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being representative of at least one characteristic of the wireless communication channel (i.e. the SIR); and generating a signal quality estimate (See the outputs of the SIR blocks) as a function of the at least one field in the received signal (i.e. the delayed version of the field) and the generated at least one reference field (see the outputs of the fading compensation units and column 6, lines 48-58). Sano discloses all the subject matters claimed in claim 38, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding

the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract).

4. Claims 2-4, 6, 26, 27, 29, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano and Tzannes, further in view of Mobin et al. (hereafter, referred as Mobin) (US 6,522,696).

As to claims 2 and 26, Sano and Tzannes disclose all the subject matters claimed in claims 1 and 25, except that the step of generating the signal quality estimate comprises measuring a difference between one or more constellation points associated with the at least one reference field and one or more corresponding constellation points associated with the at least one field in the received signal. Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last

paragraph).

As to claim 3, Mobin further discloses that the measured difference comprises a Euclidean distance (see column 10, line 28)). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claims 4 and 27, Mobin further disclose that the step of generating the signal quality estimate comprises the steps of: aligning the one or more constellation points associated with the at least one field in the received signal with the one or more corresponding constellation points associated with the at least one reference field; and generating difference signals for each of at least a portion of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the corresponding at least one reference field (see column 10, lines 12-35). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claims 6 and 29, Sano and Tzannes disclose all the subject matters claimed in claims 1 and 25, except for generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field; and determining a magnitude of the difference signal, the signal quality estimate being a function of the magnitude of the difference signal. Mobin discloses

generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field (see column 10, lines 12-35); and determining a magnitude of the difference signal (see column 10, line 28), the signal quality estimate being a function of the magnitude of the difference signal (see line 30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claim 34, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field based (i.e. the outputs of the fading compensation units) (inherently by using a processor), at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being representative of at least one characteristic of the wireless communication channel (i.e. the SIR). Sano discloses all the subject matters claimed in claim 34, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not disclose a comparator for generating a signal quality estimate as a function of the at least one field in the received signal and the generated at least one reference field. As to the first limitation, Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e.

a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e, 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

5. Claims 7-9, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, further in view of Balachandran et al. (hereafter, referred as Balachandran) (US 6,215,827).

As to claims 7 and 30, Sano, Tzannes and Mobin disclose all the subject matters claimed in claims 6 and 29, except averaging at least a portion of magnitudes of difference signals corresponding to a plurality of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the at least one reference field for a given one of the samples, the signal quality estimate being a function of the averaged magnitudes. Balachandran, in the same field on endeavor, discloses a system and method to measure channel quality in terms of signal to interference ratio (see the abstract). Balachandran further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63).

As to claims 8 and 31, Balachandran shows that the averaging step comprises adding a magnitude value corresponding to a present sample in the at least one field in the received signal to a magnitude value corresponding to a previous sample in the at least one field in the received signal (see column 7, lines 35-63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63).

As to claim 9, Tzannes discloses uses SIGNAL field header in the packet (see paragraph 0066). According to the IEEE 802.11a standard, inherently this SIGNAL field contains 48 bits.

6. Claims 10 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, further in view of Li et al. (hereafter, referred as Li) (US 2003/0157914).

As to claims 10 and 32, Sano and Tzannes disclose all the subject matters claimed in claims 1 and 25, except for generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field; and determining a magnitude of the difference signal, the signal quality estimate being a function of the magnitude of the difference signal. Mobin discloses generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field (see column 10, lines 12-35); and determining a magnitude of the difference signal (see column 10, line 28), the signal quality estimate being a function of the magnitude of the difference signal (see line 30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes and Mobin disclose all the subject matters claimed in claims 10 and 32, except that instead of measuring the magnitude of the difference signal, power of the difference signal could be measured. Li discloses a communication apparatus wherein the residual interfering signal is removed to improve the quality of the received signal (see the

abstract). Li further discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal (see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

7. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, Li, further in view of Balachandran.

As to claim 11, Sano, Tzannes, Mobin and Li disclose all the subject matters claimed in claim 10, except averaging at least a portion of magnitudes of difference signals corresponding to a plurality of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the at least one reference field for a given one of the samples, the signal quality estimate being a function of the averaged magnitudes. Balachandran discloses a system and method to measure channel quality in terms of signal to interference ratio (see the abstract). Balachandran, further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63). As already disclosed in rejection of claim 10, Li discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal

(see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

8. Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano and Tzannes, further in view of Balachandran.

As to claims 15, Sano shows that the received signal comprises a second field (i.e. a data field) (see Fig. 4), however, Sano and Tzannes fail to disclose that the second field having a variable modulation and encoding, and changing at least one of the modulation and the encoding of the second field based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258, which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the <u>adaptive</u> channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

9. Claims 18-20, 23, 24, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, and Mobien, further in view of Balachandran.

As to claim 18, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); generating at least one reference field based (see the outputs of the fading compensation units), at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being representative of at least one characteristic of the wireless communication channel (i.e. the SIR). Sano discloses all the subject matters claimed in claim 18, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not disclose comparing the at least one field in the received signal with the at least one reference field and generating a difference signal corresponding thereto; and generating a signal quality estimate as a function of the difference signal. As to the first limitation, Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a

signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, and Mobin disclose all the subject matters claimed in claim 18, except for modifying the data transmission rate of the transmitter based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258, which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information

(interpreted as data) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

As to claim 23, Sano discloses a method for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), the method comprising the steps of: receiving a signal from the wireless communication channel (see Fig. 1), the received signal comprising at least one field (i.e. the common pilot portion); measuring at least one characteristic corresponding to the at least one field in the received signal (i.e. measuring the signal to interference ratio) (see column 5, lines 56-58). Sano discloses all the subject matters claimed in claim 23, except that the field is modulated and encoded in a substantially fixed manner. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Sano also does not disclose generating a signal quality estimate as a function of the difference between the at least one field in the received signal and the generated at least one reference field. Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding

the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin discloses a method for determining channel estimation in a communication system (see the abstract). Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, and Mobin disclose all the subject matters claimed in claim 23, except for modifying the data transmission rate of the transmitter based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258 which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the

transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. As to the limitation regarding a second field in the data packet; Sano shows that the received signal comprises a second field (i.e. a data field) (see Fig. 4), however, Sano, Tzannes, and Mobin fail to disclose that the second field having a variable modulation and encoding, and changing at least one of the modulation and the encoding of the second field based, at least in part, on the signal quality estimate. Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data or second field of data packet) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

As to claim 24, Sano discloses that characteristic comprises signal to interference ratio (or signal to noise ratio) of the at least one field in the received signal (see column 5, lines 56-58).

As to claim 37, Sano discloses an apparatus for estimating a signal quality (i.e. estimation of the signal to interference ratio (SIR)) in a wireless system (see column 6, lines 56-58), for generating at least one reference field based (see the output of the fading compensation units) (inherently by using a controller), at least in part, on the at least one field and on a channel estimation signal (see Fig. 1 and column 6, lines 44-48), the channel estimation signal being representative of at least one characteristic of

the wireless communication channel (i.e. the SIR). Sano discloses all the subject matters claimed in claim 25, except that the field is modulated and encoded in a substantially fixed manner. Sano also does not discloses generating a signal quality estimate by comparing the at least one field in the received signal and the generated at least one reference field. Tzannes discloses a communication system, comprising two transceivers, wherein the second transceiver returns to the first transceiver a positive acknowledgement that may or may not comprise optimized communication parameters (see paragraph 0058). Tzannes discloses that the packets communicated between transceivers comprise a header (i.e. a signal field) to correctly determine the packer duration (see paragraph 0064). Tzannes further discloses that the signal field is modulated according to the signal modulation encoding parameters for the standard signal field, i.e. 6Mbps BPSK, code rate =1/2 (interpreted as modulation and encoding the field in a substantially fixed manner); therefore, the receiver can correctly receive a signal field bits (see paragraph 0066). It would have been obvious to one of ordinary skill in the art at the time of invention to use a fixed modulated and encoding technique for at least one part of the packet as suggested by Tzannes to ensure that the receiver can correctly receive the signal field which contains the important timing information and as the result maximize a communication data rate (see the abstract). As to the second limitation, Mobin further discloses that a viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received

signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph). Sano, Tzannes, and Mobin disclose all the subject matters claimed in claim 37, except for modifying the data transmission rate of the transmitter based, at least in part, on the signal quality estimate. Balachandran, in the same field of endeavor, discloses a communication system apparatus comprising an encoded and modulation decision unit 258 which determines the correct encoding and modulation scheme in response to the received SIR estimate 274 from the receiver 261 (see column 14, lines 7-16). Balachandran further discloses that the adaptive channel encoder and modulator 256 then encodes and modulates the transmit data stream 252 to a predetermined scheme and transmits the information (interpreted as data) through the channel. It would have been obvious to one of ordinary skill in the art at the time of invention to adaptively change the transmission rate based on the feedbacks from the receiver to improve the efficiency of the system as suggested by Balachandran (see column 1, lines 25-38).

As to claim 19, Mobin further discloses that viterbi decoder 114 determines the branch metric quality based on measuring a difference between one or more constellation points associated with the at least one reference field (e.g. I' and Q') and one or more corresponding constellation points associated with the at least one field in the received signal (e.g. I and Q) (see column 10, lines 22-32). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano,

Tzannes, and Balachandran as suggested by Mobin in order to reduce frequency offset errors in a communication system (see column 1, last paragraph).

As to claim 20, Mobin further disclose that the step of generating the signal quality estimate comprises the steps of: aligning the one or more constellation points associated with the at least one field in the received signal with the one or more corresponding constellation points associated with the at least one reference field; and generating difference signals for each of at least a portion of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the corresponding at least one reference field (see column 10, lines 12-35). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano and Tzannes as suggested by Mobin to reduce frequency offset errors in a communication system (see column 1, last paragraph).

10. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, and Balachandran, further in view of Li.

As to claim 21, Mobin discloses generating a difference signal representative of a difference between the at least one field in the received signal and the at least one reference field (see column 10, lines 12-35); and determining a magnitude of the difference signal (see column 10, line 28), the signal quality estimate being a function of the magnitude of the difference signal (see line 30). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Sano, Tzannes and Balachandran as suggested by Mobin to reduce frequency offset errors in a

communication system (see column 1, last paragraph). Sano, Tzannes, Balachandran and Mobin disclose all the subject matters claimed in claim 21, except that instead of measuring the magnitude of the difference signal power of the difference signal could be measured. Li discloses a communication apparatus wherein the residual interfering signal is removed to improve the quality of the received signal (see the abstract). Li further discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal (see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

As to claim 22, Balachandran, further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63). As already disclosed in rejection of claim 10, Li discloses that the reception quality of the signal is continuously monitored by checking the power or amplitude of each sub-band signal (see paragraph 0025). Since it is well known in the art that it is easier to measure the power of the incoming signal instead of its magnitude; therefore it would have been obvious to one of ordinary skill in the art at the time of invention to measure power of the incoming signal to make the system more cost effective.

11. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano, Tzannes, Mobin, and Balachandran, further in view of Shurvinton et al. (hereafter, referred as Shurvinton) (US 2005/0130595).

As to claim 36, Sano, Tzannes, and Mobin, disclose all the subject matters claimed in claim 34, except an integrator coupled to the comparator, the integrator being configurable for averaging at least a portion of magnitudes of difference signals corresponding to a plurality of samples in the at least one field in the received signal, each of the difference signals being representative of a difference between the at least one field in the received signal and the at least one reference field for a given one of the samples, the signal quality estimate being a function of the averaged magnitudes. Balachandran, in the same field on endeavor, discloses a system and method to measure channel quality in terms of signal to interference ratio (see the abstract). Balachandran, further discloses using weighted (i.e. averaged) Euclidean distance metric as SIR metric (see column 7, lines 63). It would have been obvious to one of ordinary skill in the art at the time of invention to average magnitude of the difference signal to obtain a good estimated of the metric as suggested by Balachandran (see column 7, lines 52-53 and 61-63). Sano, Tzannes, Mobin, and Balachandran disclose all the subject matters claimed in claim 36, except that an integrator is used to perform the averaging function. Shurvinton discloses a communication device comprising an integrator 21, which has been used to average out the amplitude variations of the incoming signal (see paragraph 0067). It would have been obvious to one of ordinary skill in the art at the time of invention to use an integrator to determine the average of

the magnitude to reduce the error in the sampled power measurement as suggested by Shurvinton (see paragraph 0067).

Allowable Subject Matter

12. Claim 35 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

M. G

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER